

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problems Mailbox.**

**PCT**WORLD INTELLECTUAL PROPERTY ORGANIZATION  
International Bureau**01**

## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>6</sup> :

A47L 13/16, 13/20

A1

(11) International Publication Number:

WO 96/10946

(43) International Publication Date:

18 April 1996 (18.04.96)

(21) International Application Number: PCT/SE95/01035

(22) International Filing Date: 14 September 1995 (14.09.95)

(30) Priority Data:

9403398-2

7 October 1994 (07.10.94)

SE

(71) Applicant (for all designated States except US): ACTUELLE  
TRICOT I BORÅS AB [SE/SE]; P.O. Box 10, S-515 21  
Viskafors (SE).

(72) Inventor; and

(75) Inventor/Applicant (for US only): NORDIN, Rudolf [SE/SE];  
Hyggesgatan 7, S-502 57 Borås (SE).(74) Agents: GRAUDUMS, Valdis et al.; Albihn West AB, P.O.  
Box 142, S-401 22 Göteborg (SE).(81) Designated States: AM, AT, AU, BB, BG, BR, BY, CA, CH,  
CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE,  
KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MN,  
MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK,  
TJ, TM, TT, UA, UG, US, UZ, VN, European patent (AT,  
BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL,  
PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN,  
ML, MR, NE, SN, TD, TG), ARIPO patent (KE, MW, SD,  
SZ, UG).**Published**

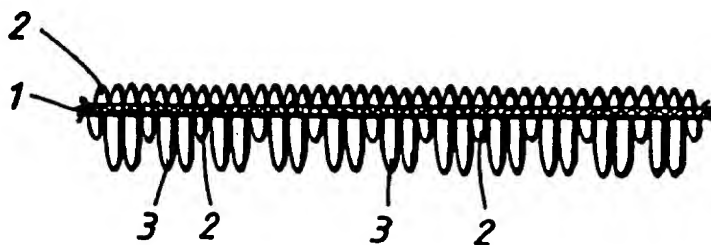
With international search report.

In English translation (filed in Swedish).

(54) Title: CLEANING CLOTH FOR CLEANING DIRTY SURFACES

## (57) Abstract

The invention relates to a cleaning cloth for cleaning dirty surfaces and it is characterized by a base fabric (1) having on one side longer loops (3) of yarn with normal fibre fineness and shorter loops (2) of microfilament yarn with great dirt and liquid absorption ability and on the other side substantially microfibre yarn with great dirt and liquid absorption ability, preferably in the shape of short loops (2). The invention also comprises a mop on the underside of which the cleaning cloth (6) according to the invention is arranged.



**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	GB	United Kingdom	MR	Mauritania
AU	Australia	GE	Georgia	MW	Malawi
BB	Barbados	GN	Guinea	NE	Niger
BE	Belgium	GR	Greece	NL	Netherlands
BF	Burkina Faso	HU	Hungary	NO	Norway
BG	Bulgaria	IE	Ireland	NZ	New Zealand
BJ	Benin	IT	Italy	PL	Poland
BR	Brazil	JP	Japan	PT	Portugal
BY	Belarus	KE	Kenya	RO	Romania
CA	Canada	KG	Kyrgyzstan	RU	Russian Federation
CF	Central African Republic	KP	Democratic People's Republic of Korea	SD	Sudan
CG	Congo	KR	Republic of Korea	SE	Sweden
CH	Switzerland	KZ	Kazakhstan	SI	Slovenia
CI	Côte d'Ivoire	LI	Liechtenstein	SK	Slovakia
CM	Cameroon	LK	Sri Lanka	SN	Senegal
CN	China	LU	Luxembourg	TD	Chad
CS	Czechoslovakia	LV	Latvia	TG	Togo
CZ	Czech Republic	MC	Monaco	TJ	Tajikistan
DE	Germany	MD	Republic of Moldova	TT	Trinidad and Tobago
DK	Denmark	MG	Madagascar	UA	Ukraine
ES	Spain	ML	Mali	US	United States of America
FI	Finland	MN	Mongolia	UZ	Uzbekistan
FR	France			VN	Viet Nam
GA	Gabon				

5       Cleaning cloth for cleaning dirty surfaces

FIELD OF THE INVENTION:

10       The present invention relates to a cleaning cloth for  
cleaning dirty surfaces and a mop on which said cleaning  
cloth is arranged.

PRIOR ART:

15       A vast number of arrangements for cleaning or wiping dirty  
surfaces are known from time immemorial. The most usual  
device is perhaps a piece of cloth of different kinds but  
even more mechanised arrangements are in use, especially  
during recent time. Vertical, horizontal and also sloping  
20       surfaces have to be cleaned from time to time and the  
arrangements for carrying out the cleaning work vary  
greatly due to the position, shape and nature of the  
surfaces. A common and very much used device for cleaning  
floor surfaces is a so-called mop.

25       A mop consists principally of an extended shaft at the  
lower end of which a disc is hingedly attached and at the  
underside of which the cleaning device itself, for example  
a piece of cloth, is arranged. The mops are usually used in  
such a way that they are wetted or dipped into water and  
30       they are pulled or pushed over a floor, whereby the dirt is  
partly dissolved and partly withdrawn with the mop. After  
the cleaning of the floor has been completed by means of  
the mop, the water is evaporated together with possibly  
volatile solvents, however, leaving a covering film  
35       consisting of first dissolved and then dried dirt.

TECHNICAL PROBLEM:

40       Use of pieces of cloth and mops may often per se give an  
acceptable result. With regard to cloths it is, however,  
often necessary to wipe with more cloths successively and

with regard to mops the above-mentioned film of dirt will be left. A further problem is that there must exist a certain friction between the support which is to be cleaned and the cleaning tool but this friction must not be too large, which means that an optimisation of the friction is desirable.

#### THE SOLUTION:

It has therefore for a very long time been a wish to improve the cleaning cloth and, for example, mops with cleaning cloth attached at the underside so that the cleaning becomes better and less strenuous.

According to the present invention a cleaning cloth for cleaning dirty surfaces has accordingly been brought about, which cleaning cloth is characterized by a base fabric having on one side longer loops of yarn with a normal fibre fineness and shorter loops of microfilament yarn having great dirt and liquid absorption ability and at the other side substantially microfilament yarn with great liquid absorption ability, preferably in the shape of short loops.

According to the invention it is suitable that the base fabric is a woven or knitted cloth consisting wholly or partly of microfibres or microfilaments.

It is further suitable according to the invention that the shorter loops consist of yarn of microfilaments or microfibres having a fineness of at most 1 Dtex.

The longer loops should, according to the invention, consist of yarn of filaments or staple fibres having a fineness of at least 1 Dtex.

The ratio between shorter and longer loops on one side of the cloth should be, according to the invention, such that 75%-25%, preferably 50% are made up by the shorter loops.

5 The microfilament yarns which are used according to the present invention consist suitably of synthetic fibres of polyester and polyamide, for example in a ratio of 70:30.

10 The yarn having a normal fibre fineness should, according to the present invention consist wholly or partly of synthetic fibres of polyester.

15 The cleaning cloth according to the present invention is used, according to a further aspect of the invention, on mops where the cloth is arranged on that side of the mop which faces the dirty surface.

20 The mop according to the present invention is further characterised in that the side of the cleaning cloth facing the dirty surface is the one which comprises both longer and shorter loops.

25 According to the invention it is suitable that the mop with the cleaning cloth is such that the cleaning cloth is sewn together with another cloth between which cloths a further one or more absorption layers for water, preferably in the shape of the cleaning cloth according to the invention, are arranged.

30 DESCRIPTION OF THE FIGURES:

The invention will in the following be described more in detail in connection with the attached drawings where

35 Fig. 1 in section shows a cleaning cloth according to the invention, where

Fig. 2 shows a principal design of a mop and where

Fig. 3 shows an example of use of the cleaning cloth according to Fig.1.

#### DETAILED DESCRIPTION:

Fig.1 shows a section through a cleaning cloth according to the invention. It consists of a base fabric 1 and shorter loops 2 at either side of the base fabric 1 and longer loops 3 on one side of the base fabric 1. The fabric may be woven or knitted with loops on both sides. It can, however, instead of having woven loops, be provided with yarn loops attached by sewing whereby loops are formed. The loops having the shorter length may also be replaced by the same material in another shape on that side which does not comprise long loops.

All yarns present in the cleaning cloth are suitably of synthetic material.

The base fabric, which suitably is woven or knitted consists of microfibrres or microfilaments or usual filaments. If microfilaments are used, the material composition consists suitably of 70% polyester and 30% polyamide and the fineness of the filaments is suitably about 0.3 Dtex. The microfilament yarn consists of 1 050 filaments per thread which gives a fineness of 330 Dtex per yarn thread.

The base fabric may also comprise 100% polyester filament yarn with a fineness per filament of 5.8 Dtex, making a fineness of about 280 Dtex for a thread consisting of 48 filaments.

The loops 2 having a shorter size consist of yarn of many and very fine fibres or filaments, which are so thin that according to terminological practice they are named micro, i.e. they have a fineness which is lower than 1 Dtex. The loops 3 having a longer length consist of yarn with a more normal fibre fineness, i.e. substantially above 1 Dtex. The yarn may be made of endless fibres (filaments) or be spun of staple fibres. The spun yarn may be a single-ply yarn or composed of many threads twisted together.

The ratio between the longer and shorter loops per surface unit on the side of the cloth which has both long and short loops is suitably between 75% and 25%, preferably 50%. An even distribution of short and long loops is preferred.

The material of the cloth, construction and yarn and the fibre formation result in unique properties for cleaning purposes. When the side of the cloth having different lengths of loops is pulled over a surface, the longer loops will have a brushing or sweeping effect and the shorter loops with microfilament yarn will have an absorbing and accumulating effect on dust and dirt particles as well as humidity on the wiped surface. The microfibre loops on both sides of the cloth as well as the yarns of the base fabric having such fibres have, due to their very large number of fibres and their flat form, a very great total material surface of synthetic fibre material.

In a dry condition the static electrical effect will attract dust and dirt particles which are bound to and between the fibre surfaces.

In a wet condition liquid is bound around the surface layer of the fibres and capillarily between them.



The longer loops with their brushing and sweeping effect have by themselves a certain absorption ability but have primarily the function of transferring dust, dirt and humidity to the microfibrils having a greater attraction force and ability to accumulate. Due to the strong absorption forces, the microfibrils will function, in loops of this surface layer as well as in the loops on the reverse side of the cloth and in the yarn of the base fabric, in the absorption and accumulation process from the cleaned surface.

Another important function is the friction of the cloth against the surface which is to be cleaned. Due to the extremely large total fibre surface of the cloth and the shape of the separate microfilaments the friction against the support will be much too large for practical work during a longer period if the abutting surface consists completely of microfilaments. This would be the case especially when humidity was used. A certain friction is, however, preferred for effective cleaning work. The longer loops with their coarser fibres of more round shape have an appreciably lower friction against the support. They are also longer with the intention that, besides having a brushing property on a not completely even surface, the cloth shall ride on these loops when being pulled over a support. An adjustment of the material, length, and proportion of these longer loops will optimise the properties of the cloth with regard to friction, brushing and accumulation.

Another important property of the synthetic material is that humidity is bound to the material surfaces and capillarily between them and to a very small extent molecularly within the fibres as is the case with, for example, cotton. Humidity can therefore actively

participate in the cleaning work if the material is wetted before use when the cleaning is carried out with humidity.

5 The good absorption and retention properties of the cloth cause very little humidity to remain on the clean surface in spite of the fact that the humidity content through the microfibres in the material is so large that it suffices for cleaning large surfaces.

10 The cloth material may also advantageously be used when cleaning where a larger amount of humidity or liquid is required. A dry or wrung-out cloth may then be used after cleaning.

15 Examples of the short loops are microfilament yarns having 330 Dtex with a fineness per filament of about 0.3 Dtex and a material composition of 70% and 30% polyamide.

20 The longer loops consist, for example, of spun yarn of staple fibres in 100% polyester with a yarn fineness of about 300 Dtex and a fibre fineness of 1.5 Dtex per fibre. The yarn may be single or consist of two finer yarns twisted together which give a fineness of about 300 Dtex.

25 Figure 2 shows a mop to be used with the cleaning cloth according to the invention. The mop consists principally of a telescopic pipe or shaft 4 which is hingedly connected with a disc 5 of aluminium or similar material. Velcro tape "males" moulded in grooves are inserted on the underside of  
30 the disc. When the mop is used, the aluminium disc 5 with the Velcro bands on the underside is simply pressed against the element of cleaning cloth which is to be used and the mounting is thereby complete. If the cleaning element is to be removed it is possible to press one's foot against it  
35 and push off the aluminium disc 5.

To use the mop in this way with Velcro tapes it is therefore necessary that the upper side of the cleaning element is constructed to serve as a female at the attachment with the Velcro tape. It is therefore suitable, according to the invention, to sew together the cleaning cloth 6 with a cloth 7 which is intended to be the upper side which has the properties of being able to be attached to the Velcro bands. Between these cloths 6 and 7 it is possible to arrange further absorption layers for water. This can suitably be done by inserting one or more layers of the cleaning cloth 6 according to the invention but even other absorption layers may be used.

The invention is not limited to the embodiments shown above but can be varied in different ways within the scope of the claims. Thus, even long loops 3 may be used on that side of the cleaning cloth where only the short loops 2 are shown in fig.1. However, this will give a lower water absorption ability than if only the short loops 2 are used. Moreover, the material in the short fibres 2 does not need to be in the shape of loops but may be arranged in another way making the absorption material. Also the base fabric 1 may consist of such an absorption element if it is produced from microfilaments.

5

## CLAIMS

1. Cleaning cloth for cleaning dirty surfaces,  
c h a r a c t e r i z e d i n that a base fabric 1, which  
10 on that side which shall face a dirty surface, has longer  
loops (3) of yarn consisting of filaments or staple fibres  
with a fibre fineness of at least 1 Dtex and shorter loops  
(2) of microfilament yarn with a fineness of at most 1 Dtex  
15 with great absorption ability of dirt and liquid and on the  
other side substantially filament yarn with a fineness of  
at most 1 Dtex having a great liquid absorption ability,  
preferably in the form of short loops.

2. Cleaning cloth according to claim 1,  
20 c h a r a c t e r i z e d i n that the base fabric (1) is  
woven or knitted consisting completely or partly of  
microfilaments.

3. Cleaning cloth according to any of claims 1 or 2,  
25 c h a r a c t e r i z e d i n that the ratio between the  
number of shorter (2) and longer (3) loops on one of the  
sides of the cloth is between 75% and 25%, preferably 50%.

4. Cleaning cloth according to any of claims 1-3,  
30 c h a r a c t e r i z e d i n that the microfilament  
yarns consist of, for example, synthetic fibres of  
polyester and polyamide in a ratio of 70:30.

5. Cleaning cloth according to any of claims 1-3,  
35 c h a r a c t e r i z e d i n that the yarn having a  
fibre fineness of at least 1 Dtex consists of synthetic  
fibres of polyester.

6. Use of the cleaning cloth according to any of claims  
40 1-5 on a mop for cleaning dirty surfaces,

10

c h a r a c t e r i z e d i n that the side of the mop which faces the dirty surface consists of the cleaning cloth according to any of claims 1-5.

- 5 7. Use according to claim 6, c h a r a c t e r i z e d i n that the cleaning cloth (6) is sewn together with another cloth (7) between which cloths (6,7) one or more further absorption layers (8) for water, preferably in the form of the cleaning cloth (6) is (are) arranged.

10

1/1

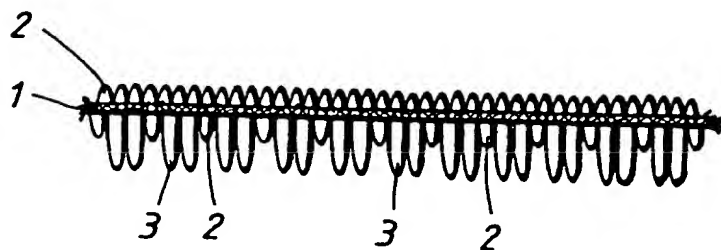


FIG. 1

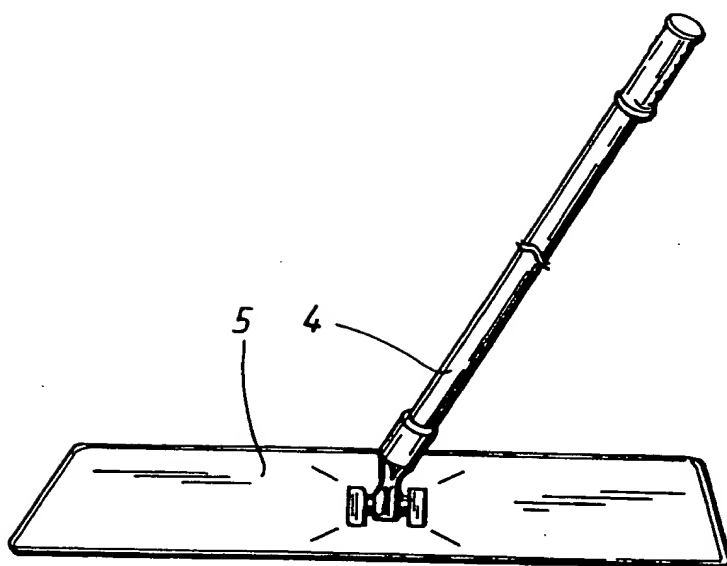


FIG. 2

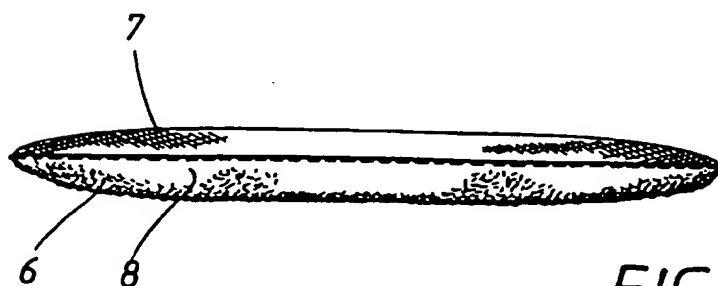


FIG. 3

1  
INTERNATIONAL SEARCH REPORT

International application No.  
PCT/SE 95/01035

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC6: A47L 13/16, A47L 13/20

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC6: A47L, D03D, D04B, D04H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, CLAIMS, PAJ

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3126572 A (O.A. FRANEY), 31 March 1964 (31.03.64), column 2, line 69 - column 3, line 3, figure 3 --	1
A	SE 431158 B (BELE RESEARCH AB), 23 January 1984 (23.01.84), figure 3 --	1
A	US 4906513 A (KEBBELL ET AL), 6 March 1990 (06.03.90), column 2, line 34 - line 37 --	1
A	US 3638270 A (SCHLEGEL, JR. ET AL), 1 February 1972 (01.02.72), column 5, line 69 - line 75, figure 9 --	1

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

\* Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

\*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

\*X\* document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

\*Y\* document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

\*&\* document member of the same patent family

Date of the actual completion of the international search

4 January 1996

Date of mailing of the international search report

27 -01- 1996

Name and mailing address of the ISA/  
Swedish Patent Office  
Box 5055, S-102 42 STOCKHOLM  
Facsimile No. +46 8 666 02 86

Authorized officer

Marianne Dickman  
Telephone No. +46 8 782 25 00

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 95/01035

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9000209 A1 (RAAB, HANS), 11 January 1990 (11.01.90), figure 1, abstract --	1
A	Patent Abstracts of Japan, Vol 17, No 190, C-1048, abstract of JP, A, 4-341230 (TORAY IND INC), 27 November 1992 (27.11.92) --	1-2
A	Patent Abstracts of Japan, Vol 17, No 622, C-1130, abstract of JP, A, 5-192284 (DAIWABO CREATE K.K.), 3 August 1993 (03.08.93) -- -----	1



**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

11/12/95

International application No.  
PCT/SE 95/01035

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A- 3126572	31/03/64	US-A- 3247009	00/00/00
SE-B- 431158	23/01/84	SE-A- 8004718	27/12/81
US-A- 4906513	06/03/90	AU-B,B- 618415	19/12/91
		AU-A- 4343489	01/05/90
		CA-A- 1305036	14/07/92
		EP-A- 0394407	31/10/90
		GR-A- 89100635	20/03/92
		JP-T- 3501821	25/04/91
		PT-B- 91868	09/08/95
		WO-A,A,A 9004060	19/04/90
US-A- 3638270	01/02/72	NONE	
WO-A1- 9000209	11/01/90	CA-A- 1307658	22/09/92
		DE-A,C- 3821857	04/01/90
		EP-A,B- 0422086	17/04/91
		SE-T3- 0422086	
		JP-T- 4501586	19/03/92
		JP-B- 7004337	25/01/95